2012 - Mazda6 - Engine

DTC P0016:00 [MZR 2.5]

DTC P0016:00	CKP-CMP correlation
DETECTION CONDITION	• The PCM monitors the input pulses from the CKP sensor and CMP sensor. If the input pulse pick-up timing do not match each other, the PCM determines that the camshaft position does not coincide with the crankshaft position. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CMP sensor malfunction ▪ Connector or terminal malfunction ▪ Foreign material on CMP sensor ▪ Damaged or scratched CMP sensor pulse wheel • CKP sensor malfunction ▪ Connector or terminal malfunction ▪ Foreign material on CKP sensor ▪ Damaged or scratched CKP sensor pulse wheel • PCM connector or terminal malfunction • Improper valve timing • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 2)/snapshot data been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT CMP SENSOR CONNECTOR CONDITION** • Switch the ignition to off. • Disconnect the CMP sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 12.
		No	Go to the next step.
4	**INSPECT CMP SENSOR FOR FOREIGN MATERIAL** • Inspect the CMP sensor for foreign materials. • Is there any foreign material on the CMP sensor?	Yes	Remove the foreign material from the CMP sensor, then go to Step 12.
		No	Go to the next step.
5	**INSPECT CMP SENSOR PULSE WHEEL** • Visually inspect the CMP sensor pulse wheel. • Are there any damage or scratches at the CMP sensor pulse wheel?	Yes	Replace the CMP sensor pulse wheel, then go to Step 12. (See **CYLINDER HEAD GASKET REPLACEMENT [MZR 2.5]**.)
		No	Go to the next step.
6	**INSPECT CMP SENSOR** • Reconnect the CMP sensor connector. • Inspect the CMP sensor. (See **CAMSHAFT POSITION**	Yes	Replace the CMP sensor, then go to Step 12. (See **CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION [MZR 2.5]**.)
		No	Go to the next step.

	(CMP) SENSOR INSPECTION [MZR 2.5].) • Is there any malfunction?		
7	**INSPECT CKP SENSOR CONNECTOR CONDITION** • Switch the ignition to off. • Disconnect the CKP sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 12.
		No	Go to the next step.
8	**INSPECT CKP SENSOR FOR FOREIGN MATERIAL** • Inspect the CKP sensor for foreign materials. • Is there any foreign material on the CKP sensor?	Yes	Remove the foreign material from the CKP sensor, then go to Step 12.
		No	Go to the next step.
9	**INSPECT CKP SENSOR** • Reconnect the CKP sensor connector. • Inspect the CKP sensor. (See CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [MZR 2.5].) • Is there any malfunction?	Yes	Replace the CKP sensor, then go to Step 12. (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
10	**INSPECT PCM CONNECTOR CONDITION** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 12.
		No	Go to the next step.
11	**INSPECT VALVE TIMING** • Inspect valve timing. • Is there any malfunction?	Yes	Adjust the valve timing properly, then go to the next step. (See TIMING CHAIN REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.

12	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See **AFTER REPAIR PROCEDURE [MZR 2.5]**.) • Start the engine and warm it up completely. • Perform the Pending Trouble Code Access Procedure. (See **ON-BOARD DIAGNOSTIC TEST [MZR 2.5]**.) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See **PCM REMOVAL/INSTALLATION [MZR 2.5]**.) Go to the next step.
		No	Go to the next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See **AFTER REPAIR PROCEDURE [MZR 2.5]**.) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC TABLE [MZR 2.5]**.)
		No	DTC troubleshooting completed.

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DTC P0016:00	CKP-CMP correlation
DETECTION CONDITION	• The PCM monitors the input pulses from the CKP sensor and CMP sensor. If the input pulse pick-up timing do not match each other, the PCM determines that the camshaft position does not coincide with the crankshaft position. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CMP sensor malfunction ▪ Connector or terminal malfunction ▪ Foreign material on CMP sensor ▪ Damaged or scratched CMP sensor pulse wheel • CKP sensor malfunction ▪ Connector or terminal malfunction ▪ Foreign material on CKP sensor ▪ Damaged or scratched CKP sensor pulse wheel • PCM connector or terminal malfunction • Improper valve timing • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 2)/snapshot data been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT CMP SENSOR CONNECTOR CONDITION** • Switch the ignition to off. • Disconnect the CMP sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 12.
		No	Go to the next step.
4	**INSPECT CMP SENSOR FOR FOREIGN MATERIAL** • Inspect the CMP sensor for foreign materials. • Is there any foreign material on the CMP sensor?	Yes	Remove the foreign material from the CMP sensor, then go to Step 12.
		No	Go to the next step.
5	**INSPECT CMP SENSOR PULSE WHEEL** • Visually inspect the CMP sensor pulse wheel. • Are there any damage or scratches at the CMP sensor pulse wheel?	Yes	Replace the CMP sensor pulse wheel, then go to Step 12. (See **CYLINDER HEAD GASKET REPLACEMENT [MZR 2.5]**.)
		No	Go to the next step.
6	**INSPECT CMP SENSOR** • Reconnect the CMP sensor connector. • Inspect the CMP sensor. (See **CAMSHAFT POSITION**	Yes	Replace the CMP sensor, then go to Step 12. (See **CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION [MZR 2.5]**.)
		No	Go to the next step.

	(CMP) SENSOR INSPECTION [MZR 2.5].) • Is there any malfunction?		
7	**INSPECT CKP SENSOR CONNECTOR CONDITION** • Switch the ignition to off. • Disconnect the CKP sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 12.
		No	Go to the next step.
8	**INSPECT CKP SENSOR FOR FOREIGN MATERIAL** • Inspect the CKP sensor for foreign materials. • Is there any foreign material on the CKP sensor?	Yes	Remove the foreign material from the CKP sensor, then go to Step 12.
		No	Go to the next step.
9	**INSPECT CKP SENSOR** • Reconnect the CKP sensor connector. • Inspect the CKP sensor. (See CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [MZR 2.5].) • Is there any malfunction?	Yes	Replace the CKP sensor, then go to Step 12. (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
10	**INSPECT PCM CONNECTOR CONDITION** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 12.
		No	Go to the next step.
11	**INSPECT VALVE TIMING** • Inspect valve timing. • Is there any malfunction?	Yes	Adjust the valve timing properly, then go to the next step. (See TIMING CHAIN REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.

12	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See **AFTER REPAIR PROCEDURE [MZR 2.5]**.) • Start the engine and warm it up completely. • Perform the Pending Trouble Code Access Procedure. (See **ON-BOARD DIAGNOSTIC TEST [MZR 2.5]**.) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See **PCM REMOVAL/INSTALLATION [MZR 2.5]**.) Go to the next step.
		No	Go to the next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See **AFTER REPAIR PROCEDURE [MZR 2.5]**.) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC TABLE [MZR 2.5]**.)
		No	DTC troubleshooting completed.

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